

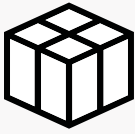


THE MODULAR CORE

The Core for Mobile, IoT &
Private Networks

Pioneering Smart Connectivity for a
Connected World





HLR/HSS (LTE,IMS) and UDR/UDM/AUSF/UDSF in a single piece of software.



Smooth interworking or transition between 3G/4G/5G thanks to the Modular Mobile Core Control Plane.



Deployable in a cloud environment as CNF, in virtualized environments or hybrid (VMS+CNFs).



Extensible and expandable framework to develop ad-hoc features.



Transparent pricing to control total TCO. No pricing per feature/module and no trap into low price and expensive extensions.



Flexible and adaptable to the needs of the customer. We work on Open roadmap principles.



Based on open standards and Open Source solutions to offer a cost-conscious carrier-grade suite. From thousand to millions of subscribers.

The Crucial Role of a Core in Mobile, IoT, and Private Networks

In the realm of telecommunications, a Full Core stands as the cornerstone, particularly within mobile, IoT, and private network environments. At Summa Networks, we recognize its paramount significance in shaping robust and efficient communication infrastructures.

The conundrum for mobile carriers is that when faced with the need to evolve their core to 5G, there is a new technological stack that in most cases is not in their skillset. Therefore, they tend to look for shelter in vendors that promise them to take care of all the complexities of the architectural evolution by using a closed Mobile core solution. The downside, is that the freedom heralded by 5G, where Carriers can choose their preferred Network Functions vendors to interoperate is lost with that approach. This creates a fundamental contradiction: while 5G brings a new degree of freedom for carriers, many carriers are choosing to lock themselves into a single vendor solution to avoid the complexities of the shifts towards 5G.

At Summa Networks, we want to offer an optimal solution to offer the best of both worlds. The comfort of a full core solution with the freedom of replaceable Network Functions always compliant to 3GPP standards allowing at the same time adHoc extensions without breaking the standards.

Our Modular CORE for Mobile, IoT and Private Networks solution includes a convergent SDM, EIR/5G EIR, ENUM/DNS, PCRF/PCF, AAA/NSS-AAF, RedCap SMSC/SMSF, NSSF/NEF, IMS Core and an integrated User Plane solution.

Summa Networks' Modular Core empowers innovation by providing a flexible and scalable architecture, essential for adapting to evolving technological landscapes. Moreover, it reinforces competitive differentiation, enabling businesses to deliver high-quality services and stay ahead in dynamic markets.

Your partner in your transition to 5G

When it comes to having your own Subscribers Data Management system, it is essential to find a provider with a complete state-of-the-art solution offered in a flexible licensing model with outstanding customer service.

Our carrier-grade SDM software allows seamless migration and interworking between the different access technologies through a flexible commercial model: classical CAPEX (perpetual licence and annual maintenance), OPEX (monthly capacity payments) always based on ACTIVE subscribers, so we are back to back with your business, we offer you a transparent and scalable solution that grows with your business success. We protect your business and your investment with a future-proof roadmap. Finally, our support is built on attention to detail, technical excellence and full availability to our customers.

Our main principles, are built to ensure a long-term relationship with our customers:

- + Flexible and adaptable to the needs of the customer. We work on open roadmap principles. We can serve from hundred to millions of subscribers.
- + Transparent pricing to control total TCO. No feature redundancy and no lock-in into low price and expensive extensions.
- + Based on open standards and Open Source solutions to offer a cost-conscious carrier-grade solution. We can serve from hundred to millions of subscribers.

As a result, we serve an ever-growing of satisfied customer and subscriber base.

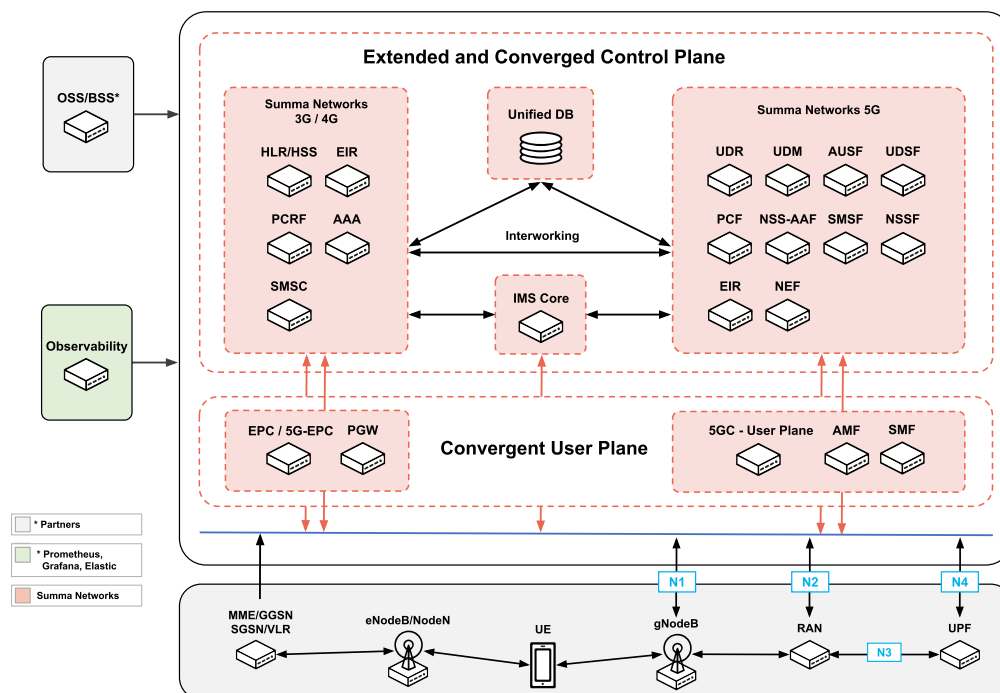
Summa Networks SDM covers many different types of customers and solutions

- + Multi-IMSI, Multi-SIM businesses needing Multi-Instance features and extensive roaming solutions. Extended to 5G SA.
- + Carriers transitioning to 5G and beyond.
- + MVNOs becoming full MVNO.
- + MNOs RIP and Replace of legacy or High-Risk Vendors.
- + IoT communication providers.
- + VoLTE, VoWiFi enablement.
- + Private LTE Networks Subscribers Management.
- + Satellite communications companies.
- + 3G roaming outsourcing.

Single software solution for Unified and Converged Control Plane needs from 2G to 5G

Summa provides an excellent alternative for service providers facing the typical barriers of the traditional SDM products:

- + HLR, AuC, LTE HSS, IMS HSS, UDR, UDM, AUSF, UDSF in a single piece of software for a smooth interworking between all network generations.
- + Complete offering for GSM, UMTS, LTE, IMS, Wi-Fi and M2M networks.
- + Integrated AAA server and NSS-AAF.
- + Integrated EIR, DNS/ENUM, NEF.
- + Full PCRF and PCF.
- + Designed from scratch for scalability, it can accommodate millions of subscribers for MNOs while remaining cost-effective also for smaller operators, MVNO's, P-LTE cores.
- + Robust, carrier grade solution, vertical (same server) and N+1 scalable, high availability, geo-redundancy.
- + Convergence of subscriber information across access networks. Single subscription with unlimited number of profiles.
- + Support for multi-SIM, multi-IMSI, multi-MSISDN, multi-HPLMN/country, multi-profile and virtual routing instances.
- + Full API (WS and REST) to integrate with OSS/BSS, provisioning.
- + GUI for management including KPIs and, links status.
- + Multi-tenant solution to support multiple carriers in a single instance.
- + Extended Control Plane can be deployed in any type of environment:
 - Bare-metal, VMs (KVM, vmWare...)
 - Docker
 - Kubernetes for cloud native deployment.
- + Extensible and extendable framework to develop ad-hoc features.



Or a modular solution to cover specific needs

The Summa Networks portfolio includes the below separate products, so they can be deployed as stand-alone:

- + Home Subscriber Server (HSS) for LTE Data.
- + Home Subscriber Server (HSS) for IMS Voice.
- + Home Location Register (HLR) and Authentication Center (AuC) for 2G/3G.
- + Equipment Identity Register (EIR).
- + Policy Control Resource Function (PCRF).
- + Authentication, Authorization and Accounting server (AAA).
- + DNS/ENUM.
- + Mobile number Portability (MNP).
- + 5G SA UDR/UDM/AUSF/UDSF.
- + 5G PCF.
- + 5G NSS-AAF.
- + 5G NEF.

The SDM functions share a single data repository, which provides convergence of subscription-related information (subscriber profiles), authentication, subscriber location and IP information.

Summa Networks Unified and Converged Control Plane

+ Complete SDM + DNS/ENUM + AAA/NSS-AAF + NSSF/NEF
+ Adaptable User Plane + PCRF/PCR + SMSC/SMSF + IMS Core

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Summa Networks facilitates a swift transition to 5G while ensuring business-as-usual, helping carriers control their TCO through a future-proof technological evolution as a core principle. **AI-driven development and operational processes enable faster feature delivery, optimized network behavior and improved service quality, without introducing unnecessary organizational overhead.** In parallel, interworking remains a key requirement for the years to come, and **Summa Networks is a well-recognized player in converged control plane technology.**

Our trusted SDM solution, including HLR, HSS for LTE, HSS for IMS, EIR, ENUM, AAA, PCRF and 5G NSA, as well as UDR, UDM, AUSF and PCF, is provided as a single piece of software. The solution offers advanced capabilities such as Multi-IMSI (4G–5G), Lawful Interception (HSM) and flexible deployment across bare metal, virtualized, Kubernetes or hybrid environments.

Our solution is suitable for MNOs, MVNOs, MVNE/As, as well as verticals including IoT, Private Networks and Satellite Communications.

With us, your network is ready to evolve into 5G—faster, smarter and more efficiently.

40+ operators worldwide rely on us



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PCRF/PCF

VoLTE PCRF

Full Voice & Data PCRF

Pioneering Smart Connectivity
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Policy management and control made easy

As defined by industry standards, **Policy and Charging Rules Function (PCRF)** is the software node designated in real-time to determine policy rules in a multimedia network supporting the creation of rules and then automatically making policy decisions for each subscriber active on the network. Such a network might offer multiple services, quality of service (QoS) levels, and charging rules. PCRF can provide a network agnostic solution (wireline and wireless) and can also enable multi-dimensional approach which helps in creating a lucrative and innovative platform for operators. PCRF can also be integrated with different platforms like billing, rating, charging, and subscriber database or can also be deployed as a standalone entity.

PCRF plays a key role in VoLTE as a mediator of network resources for the IP Multimedia Systems network for establishing the calls and allocating the requested bandwidth to the call bearer with configured attributes. This enables an operator to offer differentiated voice services to their user(s). Operators also have an opportunity to use PCRF for prioritizing the calls to emergency numbers in the next-gen networks.

Summa Networks has implemented a Policy management and control function with a word in mind: simplicity.

Cumbersome solutions with complicated design rules, clanky web interfaces have been the norm in the PCRF space for years. Therefore we have decided to create a simple yet complete PCRF suite of solutions including:

- Voice PCRF for VoLTE, VoWiFi and basic data capabilities.
- Full PCRF for data policy and control functionalities.
- Transparent extension to 5G PCF.

Besides, our PCRF can work as a standalone solution or in conjunction with our converged 3G-4G-5G HLR/HSS, UDR/UDM, in a bundled solution which brings benefits from both operational and TCO perspectives.

Finally, our solution can work as a converged policy center for both 4G and 5G simplifying the transition into standalone 5G networks of the future. Manage your different bearers from a single policy product!

Adapted to multiple use cases

Voice PCRF Use Cases:

Summa Networks has developed a voice version of PCRF to act as the perfect companion of an HSS-IMS for VoLTE and VoWiFi deployments. It allows carriers to go VoLTE/VoWiFi easily controlling the investment and deployment complexity, paving the way as well for VoNR.

- VoLTE calls made without the need for any provisioning
- Filter calls by location
- Filter calls by IMEI
- Apply roaming rules
- Filter calls by device model
- Apply rules based on the time of the day or days of the week (happy hour)
- IMS applies rules based on the media type of the session
- Filter emergency traffic
- Filter by charging characteristics

Full PCRF Use Cases:

Summa Networks has developed a fully-fledged PCRF affordable for any kind of communication provider. It can adapt to any number of subscribers or traffic patterns, from a few thousand to scaling up to the millions, allowed by its design to run on virtualized environments as well as cloud-native systems.

- Provision and Management of Plans
- Provision and Management of Subscribers
- Plan Subscription for Subscribers
- Bill Cycle Management
- Quota Management
- Advanced Subscriber Profile
- Perform isolated testing of policies in production
- Integration with OCS

Unified Policy control:

Summa Networks PCRF is as well a PCF for 5G allowing to extend the rules and policies to subscribers in 5G SA networks as well as to those interworking between technologies (4G /5G) during the networks transition to 5G SA.

Key Features

5G PCF:

- It communicates with the SMF and the AF
- Network Slicing Subscriber Profiles
- QoS Monitoring for Managing Latency

Non-functional:

- Web based policy editor
- Multi-tenancy
- REST API for provisioning of profiles and usage plans
- High-Availability Deployments
- Prometheus Integration
- Support for Bare Metal, Virtualized and containerized Deployments
- Alarms, CDRs, EDR, KPIs, and logs are generated for customers use

Unique benefits

Product flexibility: Choose a PCRF flavour according to your needs. Voice PCRF for VoLTE/VoWiFi only or a fully fledged PCRF extended to Data Policy, Quota management and the rest of functionalities. And add a 5G PCF at your convenience.

Built on cloud native architecture but allowing flexible deployment models: Built on cloud-native principles from scratch, our PCRF can be flexibly deployed into any cloud, including containers on bare metal managed by Kubernetes, virtual machines (VMs) or any hybrid deployment model.

The Summa Networks promise: Always compliant with latest 3GPP specifications. As in our SDM product, PCRF will always be updated to 3GPP standards, so you take advantage of the most innovative features without having to wait.

Comprehensive capabilities: Addresses a wide range of use cases with a comprehensive set of field-proven capabilities.

Integration: Naturally integrated with our SDM, but ready to be integrated to any other 3GPP compliant element in the network. GUI and API functions of a service platform to interact with CRM and other systems.

Multi-tenancy: Tenant separation based on IMSI: Either MCC/MNC differs between tenants, MSIN ranges of tenants. Tenant separation based on User-Profile flag: No tenant-distinct decision prior to reading profile (user profiles of all tenants are mixed in the profile repository(ies)).

Powerful yet easy handling for simple rule creation and management: Friendly user interface to create rules without relying on fixed rule table schedules supported by A.R.T rule system. Product includes a flexible and robust web interface that enables users to configure policy rules and their evaluation criteria based on their unique business needs. This helps operators create highly contextual and personalised offers that resonate with subscribers' digital lifestyles. Features include:

- Easy-to-use GUI to create policy rules with a rich set of policy conditions.
- Manages policy profiles for UE, AM, SM (session and PCC rules).
- Provides a high-performance flexible rule engine for policy evaluation.

Protocols Supported

Our product is based on 3GPP standards and will keep evolving with them:

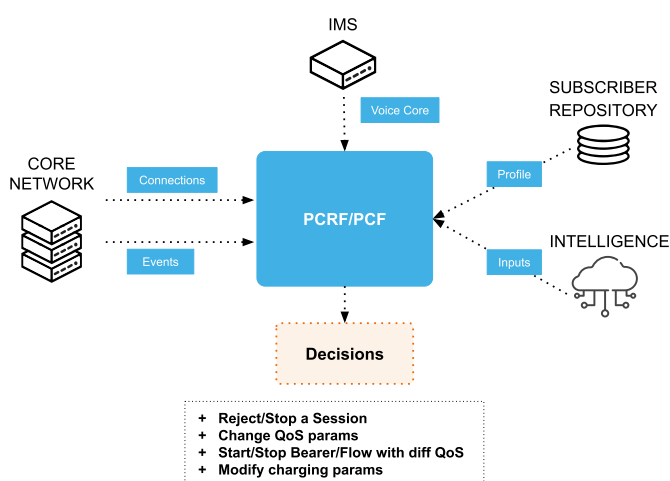
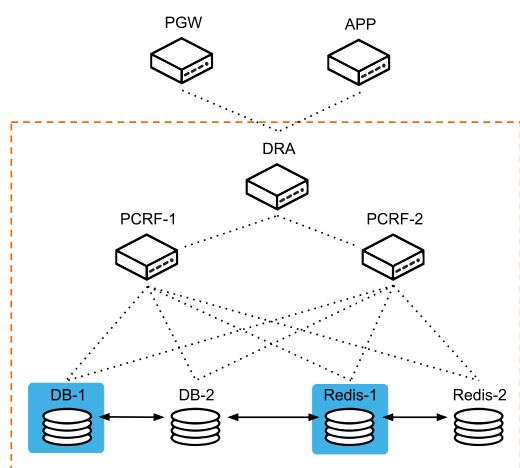
- **Subscribers based:** 23203 (Architecture), 29212 (Gx), 29214 (Rx), 29213 (Flows and QoS mappings), Sy (29219)
- **PCF:** 29512 (N7), 29414 (N5), 29513 (flows and QoS mapping), 29519 (Access to UDR)

Interoperability with 5G

Summa Networks joint combo PCF+PCRF solution naturally implements policy control requirements in 4G as well 5G networks. It provides a unified platform for configuring and managing policy decisions based on various network parameters, user subscriptions, and usage to deliver the policies.

The use cases supported are:

- Seamless session continuity for inter-RAT handover.
- Static as well as dynamic policies.
- Access mobility policy.
- Session management policy.
- IMS integration for VoNR and VoLTE.
- 4G, 5G-NSA, 5G-SA deployments.





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Our trusted SDM solution, including HLR, HSS for LTE, HSS for IMS, EIR, ENUM, AAA, PCRF and 5G NSA, as well as UDR, UDM, AUSF and PCF, is provided as a single piece of software. The solution offers advanced capabilities such as Multi-IMSI (4G–5G), Lawful Interception (HSM) and flexible deployment across bare metal, virtualized, Kubernetes or hybrid environments.

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AAA

Authentication, Authorization
and Accounting

Pioneering Smart Connectivity
for a Connected World

Authentication, Authorization and Accounting

As defined by industry standards, "AAA stands for Authentication, Authorization and Accounting, and the Diameter-based Protocol AAAS, which stands for Authentication, Authorization and Accounting with Secure Transport. These protocols were defined by the Internet Engineering Task Force in RFC 6733 and are intended to provide an Authentication, Authorization, and Accounting (AAA) framework for applications, such as network access or IP mobility in both local and roaming situations."

And this is exactly what AAA from Summa Networks does. Secure access to your network under different scenarios to enable use cases like VoWiFi, use of secondary devices, access from WiFi networks.

Key Features at a Glance: Elevate Security with Summa Networks' AAA

Unlock a secure and controlled digital environment with Summa Networks's AAA. In essence, AAA's key features provide a secure, controlled, and compliant environment by verifying identities, granting access, and tracking activities. Elevate your security strategy with Summa Networks' AAA—where precision meets protection.

Overall, AAA is a comprehensive framework that plays a crucial role in securing network access, enforcing policies, and maintaining accountability, with the flexibility to be deployed either as a standalone solution or seamlessly embedded within Summa Networks' HLR/HSS.

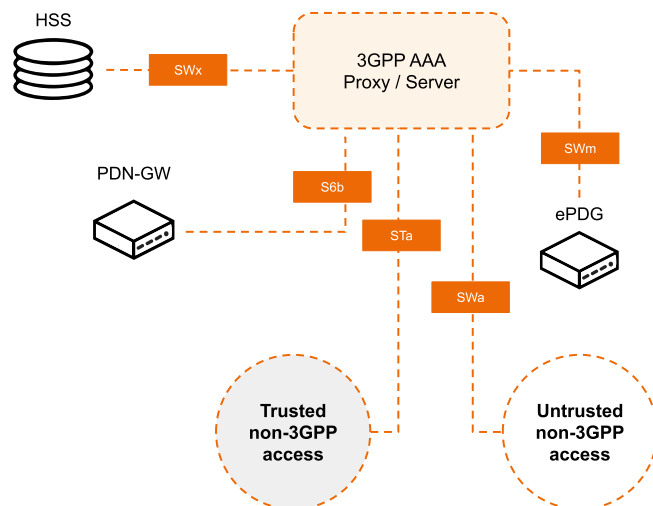
- **Authentication Simplified:** User inserts SIM card, initiates network connection. Network requests IMSI from the SIM card. Seamless, secure user authentication process.
- **Authorization Precision.**
Access Control: Define user access based on permissions and roles. Granular Control: Fine-tuned access rights for users or resources. Policy Enforcement: Enforce access control policies seamlessly.
- **Efficient Accounting.**
Audit Trails: Log user activities for auditing and compliance. Usage Tracking: Monitor and manage network/system resources.
- **Scalability and Compatibility.**
Scalability: Accommodate large user/device numbers while maintaining performance. Interoperability: Compatible with diverse environments, devices, and protocols.
- **Smart Session Management.**
Session Management: Ensure continuous user access and privileges. Integration with External Systems: Connect with external identity providers.
- **Customization for Precision.**
Customization: Tailor authentication, authorization, and logging to organizational needs. Security Event Alerts: Real-time monitoring with alerts for unauthorized activities.
- **Insightful Reporting.**
Reporting and Analytics: Analyze access patterns and identify potential threats. Compliance Support: Meet regulatory requirements with detailed logs and audit trails.

Flexible deployment

Summa Networks AAA can be deployed as a stand-alone product to connect to existing HSS, ePDG, PGW.

As a 3GPP standard compliant product, it can interwork with any other standard elements. Summa Networks' AAA is offered as well integrated with Summa Networks HSS as a single piece of software. This bundling creates a number of advantages for carriers:

- Both network functions are deployed in the same HW, no need for extra resources or communication links.
- No need for interoperability testing as products come pre-integrated and pre-tested.
- Functions are in the same instance so M&S are done over the same SW instance.



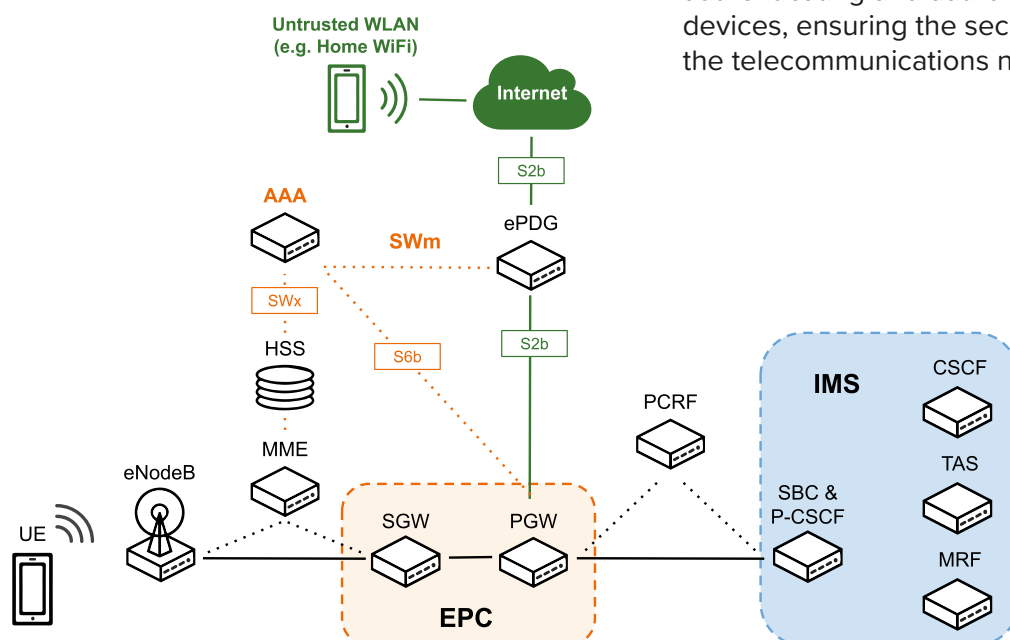
Use cases

Summa Networks' AAA cover several functional cases.

- **Trusted, untrusted access:** Non-3GPP connections into your network, from WiFi networks to IoT devices.
- **VoWiFi:** Connection from mobile devices connected to WiFi networks to perform calls over WiFi.
- **WiFi offload.**
- **Entitlement server:** Securely connect extra devices from a subscriber (wearable SIM or eSIM devices).
- **IoT Device Authentication and Authorization:** With the rise of IoT (Internet of Things) devices, AAA systems play a crucial role in authenticating and authorizing connected devices, ensuring the security and integrity of the telecommunications network.

Product features

- **SWx.** To connect to an HSS.
- **SWm.** Enables the connection to an ePDG for VoWiFi.
- **S6b.** It allows connection from AAA to PGW.
- **STa.** Trusted non-3GPP access.
- **SWa.** Untrusted non-3GPP access.





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voLTEinabox **voWiFiinabox**

Simple Plug & Play **VoLTE** and
VoWiFi solution for any carrier

The rise of VoLTE and VoWiFi

VoLTE and VoWiFi have been long promised by the Telecom industry and vendors, but it's only recently that their need has become more urgent than ever. Now that some 3G networks are seeing their sunset, the number of VoLTE capable devices has grown significantly and consumers have become familiar with data-only plans, VoLTE is developing rapidly as the only real option of keeping voice services available for customers as we go to 4G or 5G only networks.

While in 2017 less than 10% of all global mobile network subscribers were VoLTE-based, it is forecasted that due to the increasing decommissioning of 3G networks more than 80% of all phone calls will be VoLTE-based by 2025. According to Allied Market Research, Voice over Long Term Evolution (VoLTE) market is expected to garner \$34.8 billion by 2022, registering CAGR of 50.1% during the forecast period 2016 - 2022.

However, implementing a VoLTE/VoWiFi solution is not a simple task as both MNOs and MVNOs have to put together all elements needed as they are provided by separated vendors. This results in long and complicated projects and delayed go-to-market. Besides, the need for fallback to 3G generates complexities in the operational models.

To solve these shortfalls, Summa Networks developed an integrated, fully virtualized, and cost-effective VoLTE / VoWiFi solution: voLTEinabox and voWiFiInabox.

Unique benefits:

Flexible deployment model: our solutions can be deployed in bare metal, as a fully virtualized solution and as lightweight containers (Docker Swarm, Kubernetes) to run on any public or private cloud (e.g. Oracle, Amazon, RedHat, etc.) as well as on any server environment. This enables the carrier to unbundle software and hardware / Cloud infrastructure.

Client-focused: our agile product development and deployment process enables us to incorporate new client requests quickly - ca. 80% less time compared to legacy suppliers - and co-develop new solutions.

Quality: Our software components are carrier-grade to guarantee the highest possible uptime.

voLTEinabox & voWiFiInabox: VoLTE and VoWiFi in a box

They are a software-only solution that include an IMS core and a full SDM (Subscribers, Policy and Identity management) which features SWx, SWm, S6a, S6b, STa, SWa and other protocols needed to allow trusted and untrusted access to a carrier network.

They ensure a smooth transition to VoLTE and VoWiFi, as they take care of the complexity of integrating the main elements of each solution, and reduces the implementation time. This ensures a faster go-to-market and a smooth transition from circuit switched voice services to IP only voice including the 4G-3G hand-over and cross-domain capabilities that are integral part of the solution.

These solutions sit in the core of a carrier network and, as a general scenario, integrates with:

- **MME / PGW / SGW:** to receive the requests for calls from the devices in the network.
- **OCS:** for charging purposes.
- **OSS/BSS:** an API for Subscribers provisioning and management is available.
- Optionally, and depending on customer network architecture it might integrate as well with an SBC or other elements.

Standard-based and flexible: our solutions are 100% standard-compliant based on 3GPP, SIP, and has been integrated with the hardware and software of all legacy suppliers. This provides the highest possible flexibility to integrate both with legacy architecture and innovative (open-source) applications.

Cost-effective and flexible commercial model: we offer the most competitive commercial VoLTE-solution in the industry.

Scalable: We can scale up our clusters from a few thousand to millions of subscribers.

Technical details

Our solutions are based on the following components:

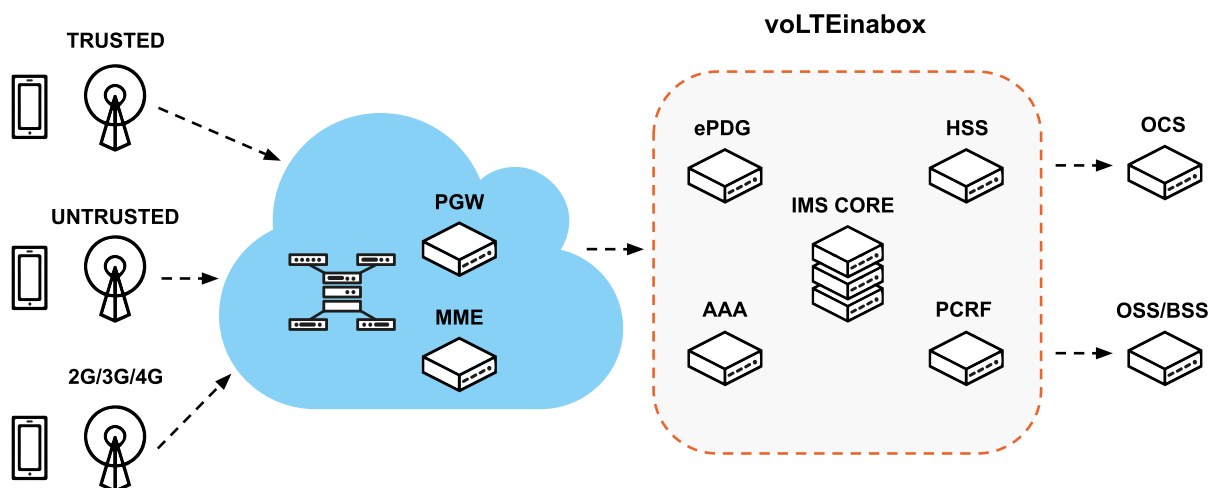
Multi-generational HSS/HLR: fully-featured converged HSS and HLR on top of a unified subscriber database.

- LTE HSS, IMS HSS, HLR and UDM/UDR in a single software suite, allowing seamless interworking between 3G, 4G, 4.5G and 5G.
- 3GPP release 16.
- Subscriber Location Function (SLF).
- Authentication Center (AuC).
- Equipment Identity Register (EIR).
- AAA server for diameter protocols.
- Complete offering for GSM, UMTS, LTE, IMS, Wi-Fi and M2M networks.
- Support for multi-SIM, multi-IMSI, multi-MSISDN, multi HPLMN/country, multi-profile and virtual routing instances.

IMS core and application servers: fully-fledged IMS core (P-CSCF, I-CSCF, S-CSCF, E-CSCF) plus all relevant application servers.

- **IP-SM-GW** - provides SMS services for VoLTE and legacy devices; allows interworking towards other networks based on SMPP.
- **MMTel/ TAS** - provides rich supplementary services, e.g. call-forwarding and call barring; acts as a conference-factory for VoLTE handsets.
- **MRF** - provides network announcements and conferencing; implemented according to RFC4240; set up as combined MRF-controller (MRFC) and -processor (MRFP).
- **SR-VCC** - enables seamless early or mid-call handover from 4G/5G to 2G/3G; acts as a media-anchor for voice calls.
- **LI** - provides X1 to X3 interfaces towards the mediation function.
- **PCRF light:** Light PCRF for VoLTE, VoWiFi functionality. Advanced PCRF: Rules Engine, Quota management. PCF for 5G.
- **ePDG light***: the ePDG allows untrusted access to the IMS as required for Voice-over-WiFi (VoWiFi); standalone solution independent of the EPC.

* From partner





Sustainability statement

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Summa Networks facilitates a swift transition to 5G while ensuring business-as-usual, helping carriers control their TCO through a future-proof technological evolution as a core principle. **AI-driven development and operational processes enable faster feature delivery, optimized network behavior and improved service quality, without introducing unnecessary organizational overhead. In parallel, interworking remains a key requirement for the years to come, and Summa Networks is a well-recognized player in converged control plane technology.**

Our trusted SDM solution, including HLR, HSS for LTE, HSS for IMS, EIR, ENUM, AAA, PCRF and 5G NSA, as well as UDR, UDM, AUSF and PCF, is provided as a single piece of software. The solution offers advanced capabilities such as Multi-IMSI (4G–5G), Lawful Interception (HSM) and flexible deployment across bare metal, virtualized, Kubernetes or hybrid environments.

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SummaNetworks SMSC

Pioneering Smart Connectivity
for a Connected World

Reason Why

Over the years, SMS has remained one of the most reliable and ubiquitous communication mechanisms in telecom networks, supporting a wide range of use cases beyond traditional messaging including network services, enterprise communications, SMS-authentication flows, A2P messaging, OTA, IoT services...

As mobile networks evolve from legacy technologies to 5G, carriers need a carrier-grade SMSC product capable of guaranteeing high deliverability, scalability and seamless interworking across multi-generation networks, from 2G to 5G SA and SMS over IP. Classical players are abandoning the space while smaller vendors do not evolve their products at the required pace.

Solution

At Summa Networks, we recognize the growing demand for reliable, scalable and flexible messaging services across today's telecom networks, as SMS continues to play a critical role well beyond traditional person-to-person communication. That is why we offer **Summa Networks SMSC**, a carrier-grade Short Message Service Center designed to address the evolving needs of operators, MVNOs and service providers supporting a wide variety of services, including enterprise messaging, network signaling, authentication flows, and specially IoT communications due to our RedCap deployment option. Our SMSC delivers enhanced connectivity, scalability and efficiency, enabling service providers to innovate and grow in an increasingly competitive and multi-service environment.

Furthermore, our advantage lies in the **modular architecture of Summa Networks SMSC**, allowing for seamless integration or separation from other core network components. This modular design offers unparalleled flexibility, enabling the SMSC to operate independently or integrate seamlessly with the Home Subscriber Server (HSS), SDM and other core elements. Whether you require a standalone SMSC deployment or a fully integrated messaging function within your existing core infrastructure, Summa Networks provides the versatility and customization needed to optimize overall network performance, simplify operations and support long-term evolution.

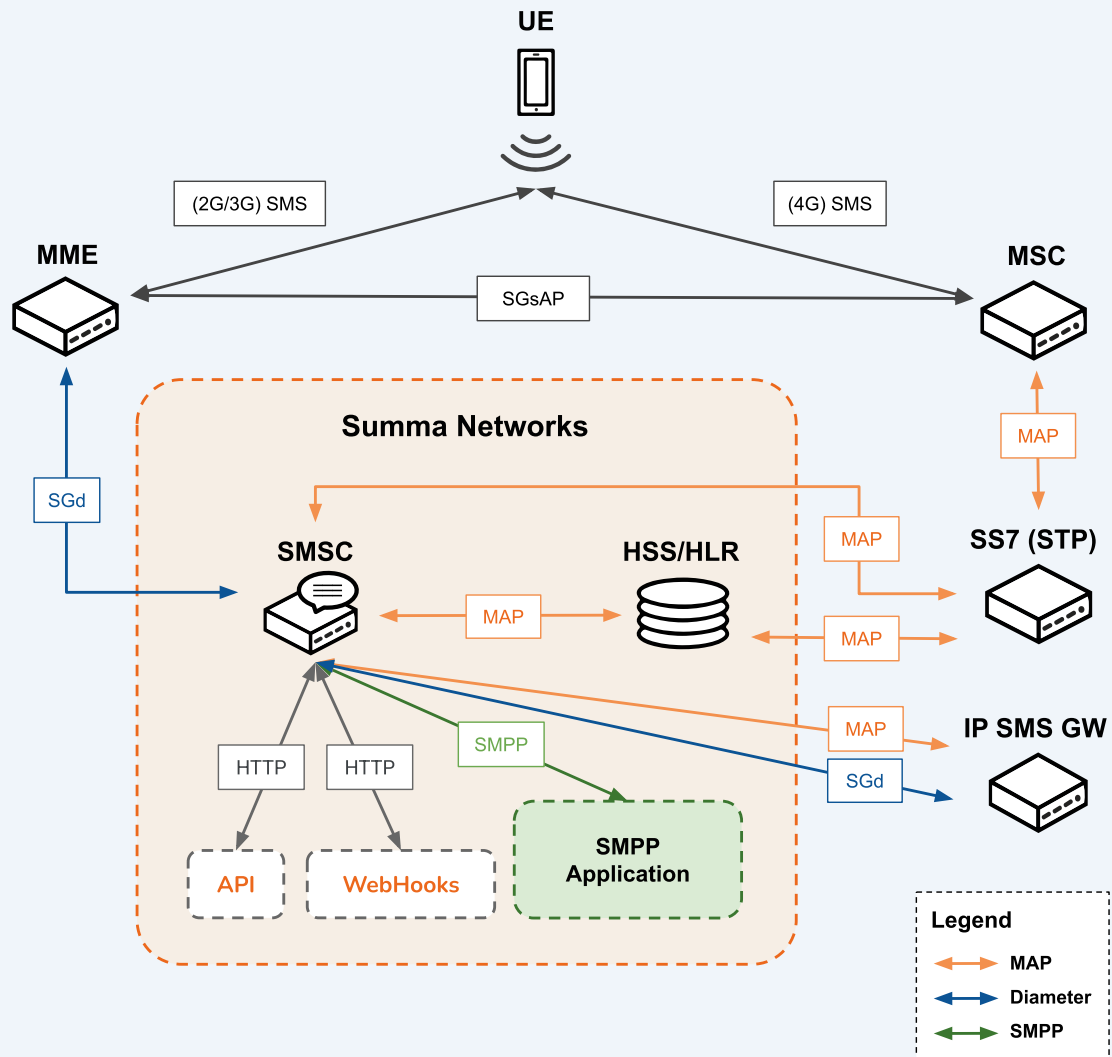
In addition to its advanced technical capabilities, Summa Networks stands out as an **adaptable technology partner**. Our DNA allows us to be agile, responsive and deeply committed to the success of our clients, enabling us to quickly adapt to changing requirements, evolving business models and new market opportunities, while maintaining close collaboration throughout the lifecycle of each project.

When considering the implementation of an SMSC, it is imperative to select a provider offering a comprehensive, carrier-grade solution within a flexible licensing framework, **supported by strong customer service and designed to facilitate seamless migration and interworking across multiple access technologies**. Summa Networks SMSC operates under a versatile commercial model that includes both traditional **CAPEX** options (perpetual license with annual maintenance) and **PAYG** models, allowing operators to align investments with business growth and operational needs.

Our core principles are structured to foster enduring partnerships:

- **Flexibility and adaptability**, tailored to specific customer requirements and guided by an open roadmap philosophy. Our system is designed to scale from a few hundred to millions of subscribers.
- **Transparent pricing**, focused on managing overall Total Cost of Ownership (TCO). We avoid feature redundancies and any form of vendor lock-in, ensuring a balance between competitive pricing and value-driven capabilities.
- **Open standards and open-source foundations**, delivering a cost-effective, carrier-grade solution capable of supporting diverse business models and long-term network evolution.
- **Standards compliance**, with all products fully aligned with the latest 3GPP releases.

With its robust, modular and standards-based design, **Summa Networks SMSC equips service providers of all sizes with the tools required to deliver reliable messaging services, expand into new revenue opportunities and compete effectively with larger players**, while supporting both established messaging services and emerging use cases such as IoT, SMS Over IP, SMSF (5G SA).



Key Summa Networks SMSC Features

The SMSC implements the main functionality of the next services:

- Handle MO Forward Short Messages requests using MAP (see TS 29002 12.2).
- Send MT Forward Short Message requests using MAP (see TS 29002 12.9).
- Send Reports SM Delivery Status requests using MAP (see TS 29002 12.3).
- Handle Alert Service Center messages using MAP (see TS 29002 12.5).
- Status Report Capabilities (see TS 23040 3.2.9).
- Handle MO Forward Short Messages requests using Diameter SGd (see TS 29.338).
- Send MT Forward Short Message requests using Diameter SGd (see TS 29.338).

The SMSC provides comprehensive support for SMPP functionalities, enabling seamless integration with various messaging applications. The main functionalities include:

- **Submit_SM**: Sending SMS messages from external applications to the SMSC for delivery to the end user.
- **Deliver_SM**: Receiving SMS messages from the SMSC to external applications, including delivery receipts.
- **Webhooks** are a powerful feature that allows external applications to receive real-time notifications from the SMSC module whenever certain events occur.

Benefits of the SMSC

A carrier-grade SMSC delivers robust, secure, and scalable messaging capabilities, enabling operators to support a wide range of SMS services for both subscribers and enterprises:

- 1. High Message Throughput:** The SMSC is designed to process very high message volumes with consistent performance. It efficiently supports peak traffic scenarios such as bulk messaging, marketing campaigns, emergency notifications, and large-scale A2P services without impacting network stability.
- 2. Low Latency Message Delivery:** Optimized routing and store-and-forward mechanisms ensure fast and predictable SMS delivery. Low latency is essential for time-critical services such as one-time passwords (OTPs), authentication messages, network alerts, and service notifications.
- 3. Carrier-Grade Reliability:** Built to meet telecom-grade requirements, the SMSC incorporates failover mechanisms to guarantee uninterrupted service and message integrity at all times.
- 4. Extended Coverage & Service Continuity:** By supporting both legacy and next-generation mobile networks, the SMSC ensures reliable message delivery across wide geographic areas, including roaming scenarios, providing consistent service regardless of user location.
- 5. Global Reach & Network Stability:** Interconnected with domestic and international partners, the SMSC enables reliable global SMS delivery, supporting both national and international messaging services with high stability.
- 6. Cost Efficiency & High Deliverability:** Efficient message routing and handling allow operators to optimize operational costs while achieving very high delivery success rates, making the SMSC ideal for large-scale A2P and enterprise messaging services.

SMSC Overview

The SMSC is a core network element that acts as the central hub for SMS delivery. It ensures reliable, secure, and scalable messaging services across multiple network generations, enabling operators to support traditional SMS traffic while expanding their A2P and enterprise messaging offerings.

Use Cases for Summa Networks SMSC

The Summa Networks SMSC enables reliable and scalable SMS services for operators and enterprises, supporting a broad range of messaging use cases:

- 1. Network & Service Notifications:** SMS-based alerts for network events, maintenance notifications, service updates, and operational communications, ensuring message delivery even when data services are unavailable.
- 2. Customer Communication & Engagement:** Billing notifications, payment reminders, service activations, promotions, and customer care communications using SMS as a trusted channel.
- 3. Roaming & International Messaging:** Reliable SMS exchange for roaming subscribers, including welcome messages, roaming alerts, and international SMS delivery.
- 4. Enterprise Messaging & Integrations:** Seamless integration with enterprise platforms via standard interfaces such as SMPP, enabling messaging services for banking, utilities, digital services, and CRM systems.
- 5. Service Activation & Provisioning:** Confirmation of service activations, subscription changes, and feature provisioning through immediate SMS notifications.



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 SummaNetworks

IMS CORE

IP Multimedia Subsystem

Pioneering Smart Connectivity
for a Connected World

IMS (IP Multimedia Subsystem): A Crucial Element in Modern Telecommunications

The IMS core is essential for providing a standardized, scalable, and interoperable platform for delivering multimedia services over IP networks. It revolutionizes communication by enabling voice, video, and messaging services over IP, ensuring interoperability, convergence of services, and efficient session control. IMS contributes to the evolution of telecommunications networks, accommodating growing demand, ensuring quality, and enhancing security through authentication and encryption. Its role is pivotal in transitioning networks towards efficient, all-IP infrastructures for multimedia service delivery.

Summa Networks' Full IMS Core: Revolutionizing Telecommunications

Summa Networks provides a Full IMS Core to offer a diverse range of multimedia services, ensuring an enhanced user experience and positioning for future industry advancements. Our advanced cloud-native IMS core facilitates seamless global connectivity through cutting-edge voice, video, and messaging tools on cellular networks and Wi-Fi.

What are the key components?

- 1. Call Session Control Function (CSCF):**
Proxy CSCF (P-CSCF): Initiates sessions and forwards requests to the appropriate next-hop CSCF.
- 2. Interrogating CSCF (I-CSCF):**
Routes session initiation requests based on user location to the Serving CSCF (S-CSCF).
- 3. Serving CSCF (S-CSCF):**
Manages call sessions, including control and service execution based on user profiles.
- 4. IP-SM-GW:**
Routes and converts SMS messages between IMS and legacy networks.
- 5. Home Subscriber Server (HSS):**
Centralized database storing subscriber information for authentication and authorization within the IMS network.
- 6. Policy and Charging Rules Function (PCRF):**
Manages QoS, charging, and resource allocation policies to ensure appropriate service levels for multimedia services.
- 7. ENUM/DNS:**
Embedded within the IMS Core, it provides essential information for S-CSCF and I-CSCF by supplying SIP URIs corresponding to assigned E.164 numbers. It resolves IP addresses for subsequent hop addresses, delivering query services.

Key Features:

Standardized Architecture:

Enables seamless service delivery across diverse networks and devices.

Security:

Essential features safeguard communication sessions and user data.

Quality of Service (QoS):

Prioritizes multimedia traffic for superior user experience.

Session Control:

Streamlines call setup and multimedia sessions for an optimal user experience.

Scalability:

Suited for networks of all sizes, from small to large-scale telecommunications.

Interconnection:

Facilitates seamless multimedia exchange between service providers and networks.

Service and Network Independence:

Works seamlessly across fixed, mobile, and IP-based networks.

Rich Communication Services (RCS):

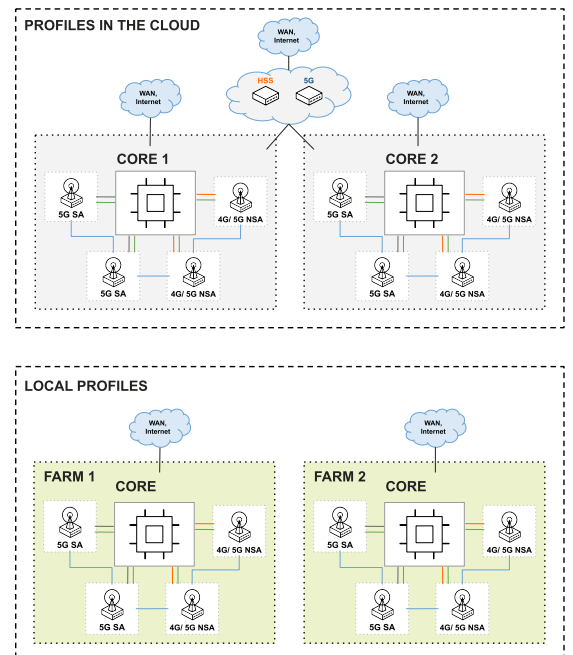
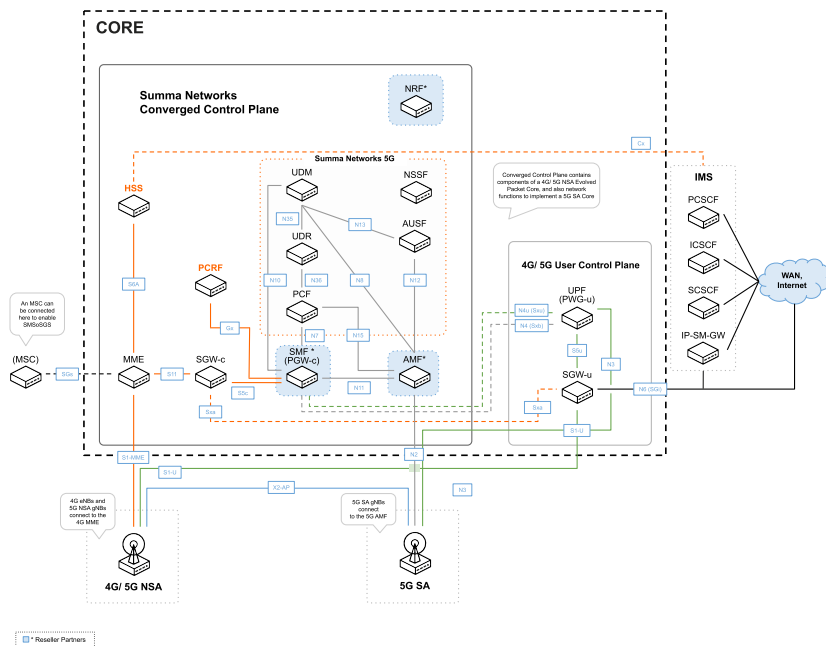
Supports enhanced messaging services like group chats and file sharing.

Evolution to 4G and 5G:

Crucial for transitioning to advanced networks, enabling services like VoLTE and multimedia communication.

These components collaborate to enable multimedia service delivery, ensuring session control, user authentication, efficient resource management, and interoperability. Deployment and configuration may vary based on network architecture and requirements.

Summa Networks' Full IMS Core revolutionizes telecommunications, offering a diverse range of multimedia services for an enhanced user experience and future industry advancements. The cloud-native IMS core facilitates global connectivity through voice, video, and messaging tools on cellular networks.



Uses cases:

1. VoLTE (Voice over LTE):

Provides high-quality voice calls over LTE networks.

2. ViLTE (Video over LTE):

Enables high-quality video calls over LTE networks.

3. Rich Communication Services (RCS):

Offers advanced messaging services with features like group chat and file sharing.

4. Fixed-Mobile Convergence (FMC):

Integrates fixed-line and mobile services for a unified communication experience.

5. Unified Communications (UC):

Integrates voice, video, messaging, and conferencing into a unified platform.

6. VoWiFi (Voice over Wi-Fi):

Allows voice calls over Wi-Fi networks, enhancing coverage.

7. Multi-Device Support:

Enables seamless access to communication services across various devices.

8. Emergency Services:

Enhances emergency communication with multimedia capabilities.



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Private Networks

Setting up a Private Network

Pioneering Smart Connectivity
for a Connected World

SUMMA NETWORKS PRIVATE NETWORK SOLUTION

The need for Private Networks:

The deployment of Private networks has become a strategic imperative for enterprises seeking dedicated, high-performance connectivity solutions tailored to their unique operational needs, where specific requirements, security concerns, or limitations of public networks necessitate a dedicated and controlled network infrastructure. Private networks, whether 4G or 5G, play a crucial role in ensuring reliable and secure communication channels for organisations across various industries.

There are several instances where having a private network is crucial. Organisations handling sensitive data require security and privacy. Industries relying on uninterrupted connectivity depend on private networks to maintain stable operations and minimise downtime. Remote areas or challenging environments with limited public network infrastructure need private networks to provide a reliable communication platform. Additionally, businesses subject to strict regulations benefit from the security and control offered by private networks.

In summary, the necessity for a private network depends on specific requirements, security considerations, regulatory compliance, and operational needs of organisations or individuals. Private networks offer dedicated and controlled connectivity solutions tailored to unique business needs. While public networks may suffice for casual or temporary use cases with less stringent demands, private networks provide reliability, security, and customization essential for many enterprises in today's digital landscape.

BENEFITS OF PRIVATE NETWORKS

- Better wireless coverage.
- Improved security.
- MNOs LTE networks as backup.
- More predictable and stable wireless experience compared to WiFi deployments.
- Skip wires entirely.

PRIVATE NETWORKS KEY CONSIDERATIONS

Implementing a Private Network is a complex endeavour, requiring careful consideration and planning. A fundamental challenge is selecting a core network that aligns with the unique requirements of the business model. Each private network instance must be meticulously designed to cater for the specific needs of the organisation and must prioritise their requirements and develop a comprehensive plan for network setup, deployment and operation.

A crucial element of the core network is the Subscriber Data Management (SDM) solution, capable of seamlessly handling multiple IMSIs and/or SIMs and handling the roaming between private and public networks, a key feature of the solution. Besides, solutions should contemplate as well, allowing smooth transitions between different networks along with addressing diverse use cases and advanced roaming scenarios encompassing both voice and data.

KEY FEATURES

Extended Roaming Features:

Summa Networks' solution offers advanced roaming capabilities.

24/7 Support:

With a commitment to reliability, Summa Networks offers strong 24/7 support to address any issues promptly.

Flexible Business Model:

Our OPEX-based model has virtually no lower subscriber limit, ensuring adaptability to diverse needs.

Single Point of Contact (SPOC):

Summa Networks acts as the SPOC, ensuring streamlined communication and coordination.

Managed Service:

Summa Networks provides full system control, offering a managed service that ensures the seamless operation of the Private LTE/5G Solution.

Multi-IMSI, Multi-SIM, Multi-MSISDN:

Unparalleled flexibility with multiple capabilities.

Standalone NPN:

Summa Networks introduces the Standalone NPN option, allowing operators to manage isolated and private networks. This option provides access to PLMN services, and the network is identified by a Network Identifier (NID).

Non-Standalone PN:
ROAMING into carrier networks.

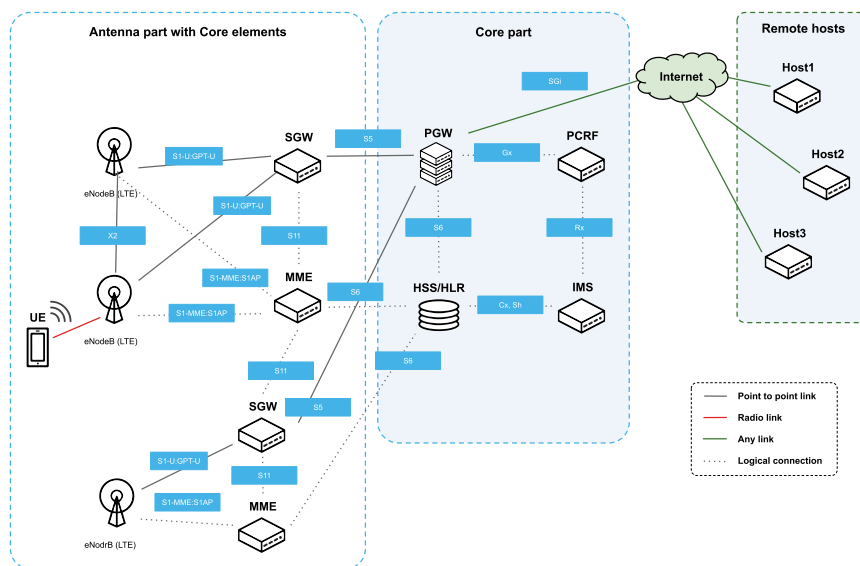
SUMMA NETWORKS: YOUR ULTIMATE PRIVATE LTE/5G SOLUTION

Choose Summa Networks for a unique and versatile solution that addresses your Private LTE/5G network requirements efficiently.

Summa Networks is your go-to choice for state-of-the-art Private network solutions, aligning seamlessly with the demands of the modern telecommunications market. Our mobile core solution stands out as a central and indispensable component for private networks deployment.

Summa Networks Private Networks Solution covers a spectrum of services, including DATA, VoLTE, and VoWiFi, ensuring a versatile and comprehensive solution for diverse communication needs.

This solution is tailored to meet the requirements of various industries, offering a private network experience with the flexibility of different RAN options and a suite of proprietary software from Summa Networks.



Summa Networks Private Network solution includes:

- Extended and converged control plane, covering from 2G to 5G SA.
- IMS core, AAA in case voice over 4G is needed.
- User plane.
- Roaming into Public networks.
- Optional, an antenna and eNodeB.

USES CASES

Industrial IoT (IIoT):

Drive efficiency in manufacturing, logistics, and utilities.

Energy & Utilities:

Enable smart grid creation and remote infrastructure monitoring for energy and utilities.

Mission Critical Communication:

Ensure low-latency, high-reliability communication for critical operations in public safety and healthcare.

Smart Cities:

Contribute to smart city initiatives for traffic management and public safety.

Healthcare:

Support telemedicine, real-time patient monitoring, and healthcare accessibility.

Education & Campus Networks:

Enhance connectivity on educational campuses and support precision agriculture for improved crop yields and resource management.



Sustainability statement

Summa Networks is committed to sustainability from the ground up, it is an energy-efficient company by design.

Telecom industry represents 3% of energy consumption and carbon footprint.

Within that, while the Radio Access Network (RAN) significantly contributes to global energy usage, accounting for approximately 73% of energy consumption in telecom networks, Mobile Core, where Summa Networks operates with its software, represents only 0.06% of the energy consumption within the telecom sector.

Nevertheless, when it comes to our energy-efficient software production, we can highlight how we design and develop our solutions in ways that optimise hardware and energy resource usage. This involves implementing efficient algorithms, optimising code, and responsibly utilising system resources, all of which reduce the burden on hardware equipment and minimise energy consumption during the execution of our applications. We could also emphasise that our software development philosophy includes a continuous commitment to improving and innovating in energy efficiency.

Moreover, we have a clear compromise with the sustainability principles:

- 🌱 We focus on producing software that minimises resource consumption, including CPU, memory, and disk usage, ensuring efficient operations while reducing environmental impact.
- 🌱 Our commitment to sustainability extends to our operational practices. With no physical office, we prioritise remote work, enabling our employees to work from home using personal PCs. This not only reduces our carbon footprint but also promotes a healthier work-life balance. By embracing remote work, we minimise commuting emissions, alleviating traffic congestion and air pollution in our communities.
- 🌱 We use cloud services for our processes, taking advantage of their green policies on our behalf.

Furthermore, Summa Networks partners with responsible suppliers who share our commitment to ethical and environmental standards. Our internal servers are located in data centres with green certification, and all our code resides in secure cloud systems where we rely on green initiatives by Hyperscalers. This ensures that our operations align with sustainable practices and contribute to a more sustainable future for all.

In summary, Summa Networks is dedicated to sustainability in every aspect of our operations. From our minimal energy consumption as a software producer to our remote work policies and responsible supplier selection, sustainability is woven into the fabric of our company. We believe that by prioritising sustainability, we can make a meaningful contribution to a greener, more sustainable future.

About Summa Networks

Summa Networks is the market specialist in Subscribers, Policy, Identity and Connectivity Management. Our mission is to help carriers of all sizes and types navigate their long and complex transition to 5G through a unique suite of Control Plane products covering 2G, 3G, 4G, 5G NSA and 5G SA in a single system. **Building on deep telecom expertise and an AI-driven approach, Summa Networks enables operators to evolve their networks more efficiently, reducing complexity and accelerating innovation while maintaining full control of operations.**

Summa Networks facilitates a swift transition to 5G while ensuring business-as-usual, helping carriers control their TCO through a future-proof technological evolution as a core principle. **AI-driven development and operational processes enable faster feature delivery, optimized network behavior and improved service quality, without introducing unnecessary organizational overhead. In parallel, interworking remains a key requirement for the years to come, and Summa Networks is a well-recognized player in converged control plane technology.**

Our trusted SDM solution, including HLR, HSS for LTE, HSS for IMS, EIR, ENUM, AAA, PCRF and 5G NSA, as well as UDR, UDM, AUSF and PCF, is provided as a single piece of software. The solution offers advanced capabilities such as Multi-IMSI (4G–5G), Lawful Interception (HSM) and flexible deployment across bare metal, virtualized, Kubernetes or hybrid environments.

Our solution is suitable for MNOs, MVNOs, MVNE/As, as well as verticals including IoT, Private Networks and Satellite Communications.

With us, your network is ready to evolve into 5G—faster, smarter and more efficiently.



SummaNetworks
10th Anniversary

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